

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An exposure apparatus that exposes a substrate by emitting exposure light onto the substrate through a projection optical system and a liquid, the exposure apparatus comprising:

a detection apparatus that detects whether a liquid is present on an object that is disposed lower than a front end of the projection optical system at a time when the exposure light is emitted onto the substrate by the projection optical system.

2. (Previously Presented) An exposure apparatus according to Claim 1, wherein: the detection apparatus has an emitting portion that emits detection light and a light receiving portion.

3. (Previously Presented) An exposure apparatus according to Claim 2, wherein: the detection light is emitted from the emitting portion to a plurality of positions, and at least one of a size and a shape of the liquid on the object is obtained based on a light receiving result of the light receiving portion.

4. (Previously Presented) An exposure apparatus according to Claim 2, wherein: the detection is performed while relatively moving the detection light and the object.

5. (Previously Presented) An exposure apparatus according to Claim 4, wherein: the object is movable with respect to the projection optical system.

6. (Previously Presented) An exposure apparatus according to Claim 5, wherein: the object includes at least one of the substrate, a substrate stage that is movable and holds the substrate, and a member provided on the substrate stage.

7. (Previously Presented) An exposure apparatus according to Claim 2, further comprising:
- a bending portion that bends an optical path of the detection light.
8. (Previously Presented) An exposure apparatus according to Claim 2, wherein: the detection light is emitted substantially parallel to a surface of the object.
9. (Previously Presented) An exposure apparatus according to Claim 8, wherein: whether the liquid is present in an optical path of the detection light is determined based on a light receiving result of the light receiving portion.
10. (Previously Presented) An exposure apparatus according to Claim 8, wherein: the detection light passes through an area away from the surface of the object by 5.5 mm or less than 5.5 mm.
11. (Previously Presented) An exposure apparatus according to Claim 2, wherein: a position of the liquid on the object is obtained based on a light receiving result of the light receiving portion.
12. (Previously Presented) An exposure apparatus according to Claim 2, wherein: the emitting portion emits the detection light to a space between the projection optical system and the object.
13. (Previously Presented) An exposure apparatus according to Claim 2, wherein: the emitting portion emits the detection light to a surface of the object.
14. (Previously Presented) An exposure apparatus according to Claim 13, wherein: the light receiving portion receives light from the surface of the object, and the liquid on the surface of the object can be detected based on the light receiving result.
15. (Previously Presented) An exposure apparatus according to Claim 13, wherein:

the surface of the object includes a recessed portion formed on the object.

16. (Previously Presented) An exposure apparatus according to Claim 15, wherein:

the recessed portion is provided to a substrate stage that is movable and holds the substrate, and a substrate holder that holds the substrate is disposed in the recessed portion, and the detection apparatus also detects whether liquid is present on the substrate holder at a time when the substrate is not held on the substrate holder.

17. (Previously Presented) An exposure apparatus according to Claim 16, wherein:

the emission of the detection light to the substrate holder is performed before loading the substrate on the substrate holder.

18. (Previously Presented) An exposure apparatus according Claim 2, wherein:
the detection light is infrared light.

19. (Previously Presented) An exposure apparatus according to Claim 2, wherein:
the detection light includes a sheet light flux.

20. (Previously Presented) An exposure apparatus according to Claim 1, further comprising:

a liquid supply system having a supply port, that supplies the liquid; and
a liquid recovery system having a recovery port, that recovers the liquid;
wherein an operation of at least one of the liquid supply system and the liquid recovery system is controlled based on a detection result of the detection apparatus.

21. (Previously Presented) An exposure apparatus according to Claim 20, wherein:

the supply of the liquid by the liquid supply system is stopped if it is determined that the detection result of the detection apparatus is abnormal.

22. (Previously Presented) An exposure apparatus according to Claim 1, wherein:
an exposure operation is controlled based on a detection result of the detection apparatus.

23. (Previously Presented) An exposure apparatus according to Claim 1, wherein:
a warning is issued if it is determined that a detection result of the detection apparatus is abnormal.

24. (Currently Amended) An exposure apparatus that exposes a substrate by emitting exposure light onto the substrate through a projection optical system and a liquid, the exposure apparatus comprising:

a liquid supply system having a supply port, which supplies the liquid such that the liquid covers only a portion of a surface of the substrate at a time when the exposure light is emitted onto the substrate; and

a detection apparatus having a light receiving portion provided in a space lower than the supply port of the liquid supply system, wherein the detection apparatus ~~obtains at least one of a size and a shape~~ detects a position of an edge portion of an immersion area in a direction perpendicular to an optical axis of the projection optical system, that is formed between the projection optical system and an object disposed on an image plane side of the projection optical system, based on a light receiving result of the light receiving portion.

25. (Currently Amended) An exposure apparatus according to Claim 24, wherein:
the detection apparatus includes an emitting portion that emits detection light, and at least one of ~~the~~ a size and ~~the~~ a shape of the immersion area is obtained based on the light receiving result of the detection light.

26. (Previously Presented) An exposure apparatus according to Claim 24, wherein:

a detection by the detection apparatus is performed in parallel with the exposure of the substrate.

27. (Currently Amended) An exposure apparatus according to Claim 24, wherein:
the detection apparatus includes an emitting portion that emits detection light,
and the detection light is emitted to the vicinity of ~~an~~ the edge portion of the immersion area.

28. (Currently Amended) An exposure apparatus according to Claim 24, wherein:
the detection apparatus includes an emitting portion that emits detection light,
and the detection light is emitted to each of a plurality of positions in the vicinity of ~~an~~ the
edge portion of the immersion area.

29. (Previously Presented) An exposure apparatus according to Claim 28,
wherein:
optical paths of a plurality of beams of the detection light emitted to the
vicinity of the edge portion are set in accordance with a target shape of the immersion area.

30. (Previously Presented) An exposure apparatus according to Claim 28,
wherein:
at least two of the plurality of beams of the detection light are emitted to the
vicinity of edge portions on both sides of the immersion area, respectively.

31. (Previously Presented) An exposure apparatus according to Claim 24, further
comprising:
a liquid recovery system having a recovery port, that recovers the liquid;
wherein an operation of at least one of the liquid supply system and the liquid
recovery system is controlled based on a detection result of the detection apparatus.

32. (Previously Presented) An exposure apparatus according to Claim 31,
wherein:

the supply of the liquid by the liquid supply system is stopped if it is determined that the detection result of the detection apparatus is abnormal.

33. (Previously Presented) An exposure apparatus according to Claim 31, wherein:

the supply of the liquid by the liquid supply system is stopped if the immersion area of the liquid formed between the projection optical system and the substrate has become equal to, or larger than a predetermined size.

34. (Previously Presented) An exposure apparatus according to Claim 24, wherein:

the detection apparatus includes an emitting portion that emits detection light, and the detection light is infrared light.

35. (Previously Presented) An exposure apparatus according to Claim 24, wherein:

the detection apparatus includes an emitting portion that emits detection light, and the detection light includes a sheet light flux.

36. (Previously Presented) An exposure apparatus that exposes a substrate by emitting exposure light onto the substrate through a projection optical system and a liquid, the exposure apparatus comprising:

a shape detection apparatus that obtains a shape of the liquid on an object which is movable on an image plane side of the projection optical system.

37. (Previously Presented) An exposure apparatus according to Claim 36, wherein:

the detection apparatus has an emitting portion that emits a plurality of detection light arrayed in a vertical direction with respect to a surface of the object, and a light

receiving portion, wherein the detection apparatus obtains the shape of the liquid based on a light receiving result of the light receiving portion.

38. (Previously Presented) An exposure apparatus according to Claim 36, wherein:

an affinity of the liquid for the object is obtained based on the obtained shape of the liquid.

39. (Previously Presented) An exposure apparatus according to Claim 36, wherein:

a contact angle of the liquid with respect to the object is obtained based on the obtained shape of the liquid.

40. (Previously Presented) An exposure apparatus according to Claim 39, wherein:

the detection apparatus detects a height of the liquid on the object, and obtains the contact angle of the liquid with respect to the object based on a result of the detection.

41. (Previously Presented) An exposure apparatus according to Claim 36, wherein:

the object includes at least one of the substrate, a substrate stage that holds the substrate, and a member provided on the substrate stage.

42. (Previously Presented) An exposure apparatus that exposes a substrate by emitting exposure light onto the substrate through a projection optical system and a liquid, the exposure apparatus comprising:

a detection apparatus that detects a contact angle of the liquid, on an upper surface of a substrate stage that holds the substrate, with respect to the upper surface of the substrate stage.

43. (Previously Presented) An exposure apparatus according to Claim 42, wherein:

the contact angle of the liquid with respect to the upper surface of the substrate stage is obtained periodically.

44. (Previously Presented) An exposure apparatus according to Claim 42, wherein:

the upper surface of the substrate stage includes a surface of a member which is replaceably disposed on the substrate stage, and the member is replaced based on the detected contact angle.

45. (Previously Presented) An exposure apparatus according to Claim 42, wherein:

the upper surface of the substrate stage includes a surface of the substrate held by the substrate stage.

46. (Previously Presented) An exposure apparatus according to Claim 42, further comprising:

a liquid supply system having a supply port, that supplies the liquid; and

a liquid recovery system having a recovery port, that recovers the liquid;

wherein an operation of at least one of the liquid supply system and the liquid recovery system is controlled based on the detected contact angle.

47. (Previously Presented) An exposure apparatus according to Claim 42, wherein:

the detection apparatus detects the contact angle by emitting infrared light.

48. (Previously Presented) A device manufacturing method comprising:

exposing a substrate through the projection optical system of the exposure apparatus according to Claim 1; and

processing the exposed substrate.

49. (Previously Presented) A device manufacturing method comprising:
exposing a substrate through the projection optical system of the exposure
apparatus according to Claim 24; and
processing the exposed substrate.

50. (Previously Presented) A device manufacturing method comprising:
exposing a substrate through the projection optical system of the exposure
apparatus according to Claim 36; and
processing the exposed substrate.

51. (Previously Presented) A device manufacturing method comprising:
exposing a substrate through the projection optical system of the exposure
apparatus according to Claim 42; and
processing the exposed substrate.